JOINT MANAGEMENT PLAN REVIEW

ISSUE BACKGOUND: BEACH CLOSURES AND COLIFORM CONTAMINATION

OVERVIEW

The Monterey Bay National Marine Sanctuary (MBNMS) is dedicated to collaborating with the public in its effort to protect the marine environment. In the ten years since its designation, numerous agencies, researchers, public and private organizations and community members have helped the Sanctuary identify resource protection issues and strategies to augment its management scheme. These issues were honed through a series of scoping meetings and comment periods conducted in 2001 and 2002 as part of the Sanctuary's Joint Management Plan Review Process (JMPR). Fifteen specific issues that were of principal concern to the public and the Sanctuary were identified as areas for discussion in a working group context.

Water quality has been a frequently raised concern and one that the Sanctuary has addressed in four previous Water Quality Protection Program (WQPP) plans dealing with urban runoff, regional monitoring, marinas and boating, and agriculture. The issue of beach closures and posting has been a frequently raised concern in recent years and one that the Sanctuary has agreed to address in a new WQPP plan to be developed by a working group as a part of the Joint Management Plan Review. The MBNMS and its Sanctuary Advisory Council will look to the JMPR working groups to characterize each issue and identify strategies and activities that address the issue as they meet over the next several months.

BACKGROUND

The central coast of California is internationally known for its incomparable shoreline. Travelers come from around the world to enjoy outstanding recreational opportunities including surfing, diving and kayaking; to view the spectacular coastal scenery; to observe wildlife resources such as sea otters, whales, and seabirds; and to enjoy the seemingly pristine beauty of the ocean. In 1992, public concern over the conservation of this exceptional resource led Congress to designate the Monterey Bay National Marine Sanctuary for its ecological significance and singular beauty. Since this designation, runoff and spills along the Sanctuary's coastline have periodically resulted in high levels of coliform bacteria being detected in coastal waters, which has caused an increasing number of beaches closures or postings. These problems have many causes, including an aging sewer infrastructure system pressed to meet increasing demands, and inadequate resources available for comprehensive infrastructure diagnosis, maintenance and replacement. Additional contributing factors include illicit storm drain connections, improper disposal of materials which clog pipes, overflow of systems during storm

seasons, leaching from septic systems, urban runoff, and various domestic and wildlife sources.

Frequent bacterial contamination not only affects the public's ability to enjoy Sanctuary beaches, but growing evidence suggests that it is impacting the marine ecosystem. Human pathogens such as gastrointestinal parasites have been documented in local sea otters. Central Coast sea otter populations show abnormally high mortality due to disease, which may be a factor in the slow recovery of the species. There is also a significant aquaculture and kelp harvesting industry within the MBNMS that is highly dependent upon unpolluted water. Such threats to both human and environmental health are serious problems anywhere, but are of particular concern in an area known and designated for the health and diversity of its marine ecosystem.

Beach Closures

The decision to close or post a beach is based upon a laboratory method that counts the number of coliform bacteria contained in a water sample. While the coliform bacteria themselves may not cause human health impacts, their presence indicates the potential for water contamination and has a relationship to public health risk (e.g. skin rashes, respiratory infections, gastrointestinal illness and other diseases). Since the identification of pathogens such as viruses in ocean water is difficult, time consuming, and expensive, current water quality testing methodology relies on the usage of the more readily detected and quantified coliform bacteria. These organisms include total coliform, fecal coliform and enterococcus, and are used to reveal the presence of waste in a water sample. *E. coli* bacteria are the most prevalent form of fecal coliform bacteria. This species normally comprises approximately 85-95% of the fecal coliform that may be present in water sample.[1]

When the analysis of ocean waters adjacent to beaches identifies the presence of indicator bacteria at levels exceeding California Health Services standards for water contact sports, beaches are either posted with warning signs or are closed. County Health Officers can take three discrete actions based on beach water quality monitoring data, sewage spills, and storm events including closing a beach, posting a beach warning sign, or issuing a rain advisory.

A "Beach (ocean) Closure" occurs as a result of a known sewage spill or from repeated incidences of exceeding bacterial standards due to an unknown source. A closure is a notice to the public that the water is unsafe for contact and that there is a high risk of getting ill from swimming in the water.

A "Beach Warning" sign means that at least one bacterial standard has been exceeded, but there is no known source of human sewage. The posting of warning signs alerts the

[1] Water Quality Analysis Report, 2001-02. Santa Barbara County

public of a possible risk of illness associated with water contact. The placement of signs may be short term when a single bacterial indicator standard is exceeded or more permanent where monitoring indicates repeated contamination (e.g. from a storm drain). Warnings may also be posted where sources of contamination are identifiable and can be explained as not of human origin (e.g., resident marine mammals or seabirds).

A "Rain Advisory" is often issued when it rains because it is known from past experience that rainwater carries pollution to the beach. After a rain, bacteria counts usually exceed the State standards for recreational water use.[2]

While increased monitoring pursuant to AB411 is responsible for a pronounced jump in the number of beach closures and postings between 1998 and 1999, data from years 2000 through 2002 suggests a continued deterioration in water quality of Sanctuary beaches. During this time frame, hundreds of days occur annually where various beaches in each coastal county were posted or closed.

Sources and Analysis of Contamination

The presence of bacteria in coastal waters indicates that pathogens from untreated or partially treated sewage or contaminated runoff may be present in water. Bacteria typically enter coastal waters from sewage spills, overflows of sewage-treatment plants, and sanitary sewers, and storm water runoff from urban, suburban, and rural areas. Wildlife such as marine mammals and birds are also thought to be contributors to beach coliform levels. The pathogens from these sources have been found to be responsible for health problems ranging from fever, flu-like symptoms, ear infection, respiratory illness, gastroenteritis, cryptosporidiosis, and hepatitis.

Increasingly the public is becoming concerned about beach closures, and there is a perceived lack of confidence caused by the "up and down" nature of posting of warning signs. Further research is needed to develop analyses that better characterize nearshore pollution effects on human and marine health. The current indicators utilized are not very precise in assessing or predicting threats to human health. Rather, many types of animals produce these indicators, and they represent a range of potential risks of disease. Additionally, indicator bacteria assays take 18 to 36 hours to complete and during this time beachgoers may be exposed to harmful pathogens. By the time the beach is posted, the indicator bacteria may not be present in the nearshore waters. Thus a beach may be open when it is contaminated, and posted when it is clean. Finally, spatial, temporal, and laboratory variability decrease the reliability of indicator results.

[2] California Beach Closure Report 2000. Division of Water Quality, SWRCB, Cal. EPA

EXISTING STATUTORY AND REGULATORY FRAMEWORK

The Federal Clean Water Act and the California Water Code (Porter-Cologne Water Quality Control Act) establish the framework under which water quality is regulated in California.

Basin Plan and Ocean Standards

The State of California is divided into nine regional boards that regulate water pollution in their region. Each of these boards is responsible for administering regulations established by the Code, which directs each of the boards to develop a regional water quality control plan, or "Basin Plan." Basin Plans describe the beneficial uses of each of the region's water bodies, including warm and cold-water habitat, fish spawning, recreation, drinking water supply and several others. They also describe the water quality that must be maintained in order to allow those uses.

The regional boards implement the Basin Plans by issuing and enforcing state Waste Discharge Requirements or NPDES permits (National Pollutant Discharge Elimination System, pursuant to the Federal Clean Water Act). Anyone wishing to discharge waste to inland surface waters or the ocean from a pipe or waste facility (a “point source”) must obtain a NPDES permit from the regional board. The boards establish monitoring programs to be conducted by the discharger as a way of measuring compliance with permit provisions. Generally, sewer collection systems tributary to treatment facilities are permitted by Waste Discharge Requirements whereas the treatment facilities themselves are permitted through the NPDES system.

The State Water Resources Control Board oversees the Regional Boards’ administration of the Code. The state board is also responsible for the implementation of its Ocean Plan that establishes numeric standards for ocean water quality. The California Department of Health Services has established the State Ocean Water Quality Standards for body contact as follows:

Total Coliform – 10,000 MPN

Fecal Coliform – 400 MPN

Enterococcus – 104 MPN

Where MPN is the most probably number, defined as the statistical concentration of bacteria in 100mL of sample water.

AB 411

Increasing concern about beachwater quality prompted the approval of Assembly Bill 411 (AB411, the Right To Know Bill), which amends the Health and Safety Code of the State of California required the California State Department of Health Services to develop statewide beachwater-quality criteria and monitoring regulations. AB 1946 is a

follow-on bill to AB 411, and it improves upon data collection requirements and public disclosure standards.

Beginning in 1999, AB411 required local health officers to conduct weekly bacterial testing between April 1 and October 31 of waters adjacent to public beaches that have more than 50,000 visitors annually and are near storm drains that flow in the summer. San Mateo, Santa Cruz, Monterey, and San Luis Obispo counties each have beaches that meet these criteria.

NPDES

In addition to the point source and waste discharge requirement programs, the State Board regulates "nonpoint" source discharges via the Storm Water NPDES program. The storm water program is divided into two phases. Phase I was promulgated in 1987 and regulated "medium" and "large" municipal separate storm sewer systems (MS4s) generally serving populations of 100,000 or greater, construction activity disturbing 5 acres of land or greater, and ten categories of industrial activity. In the Sanctuary watersheds, the City of Salinas is covered under a Phase I permit.

Phase II of this program is now underway, and in 2003, the SWRCB adopted a General Permit for storm water discharges from regulated Small MS4s (municipalities with an urban population of at least 10,000 and a population density of at least 1,000 per square mile), and small construction activities.

TMDLs

TMDLs (Total Maximum Daily Loads) are designated for state waters that show signs of being impaired or impacted for beneficial uses. Waters that do not support their beneficial uses are listed on the 303(d) list of impaired waterbodies. TMDL are load allocations to be developed by the Regional Water Quality Control Boards identifying the total amount of pollution that can be discharged to 303(d) listed waterbodies from all land use categories in the watershed. While several California beaches have been listed on the 2002 303 (d) list for Coliform Contamination, no beaches adjacent to the Sanctuary have yet been included on this list, although requests have been made to the State Board to do so.

PREVIOUS SANCTUARY EFFORTS RELATED TO COLIFORM CONTAMINATION AND BEACH CLOSURES

The Sanctuary's Water Quality Protection Program (WQPP) is a partnership effort designed to enhance and protect the physical, chemical and biological conditions in the Sanctuary and its adjacent lands. The WQPP has identified a variety of water quality issues and problems in the Sanctuary and its watersheds including sedimentation, nitrates, persistent pesticides, metals, oil and grease, and detergents, and has developed and initiated implementation of several plans to address them. The WQPP previously identified coliform contamination as a threat to human and ecosystem health, and

although it was not a key focal point of previous efforts, several programs undertaken through previous plans have partly addressed the issue.

The Sanctuary's Water Quality Protection Program plans, Action Plan I: Implementing Solutions to Urban Runoff and Action Plan II: Regional Monitoring, Data Sharing and Interagency Coordination, both recommend additional assessments of coliform contamination sources, and follow-up technical strategies to address the urban runoff components of coliform contamination. Volunteer monitoring programs coordinated by the Sanctuary's Citizen Watershed Monitoring Network such First Flush, Urban Watch and Snapshot Day monitoring events have provided several years of data characterizing both wet and dry season urban runoff, including collecting and analyzing samples for bacterial indicator organisms. These data have been useful to local jurisdictions in identifying locations in the watersheds that need additional attention.

The Model Urban Runoff Program, developed by the cities of Monterey and Santa Cruz, the Monterey Bay National Marine Sanctuary, California Coastal Commission and the Regional Water Quality Control Board also includes guidelines for monitoring and source analysis for coliform bacterial and outlines an array of steps for technical follow up and education to reduce inputs.

The WQPP Agriculture and Rural Lands Action Plan was developed in 1999 to address agricultural water quality issues. The Agriculture and Rural Lands program indirectly plays a part in dealing with coliform contamination as sediment fate and transport can play an important role in bacterial survival. The sediment environment is more favorable to bacterial growth and survival, and it has been shown that stream sediments can contain bacteria counts much higher than the overlying water column.[3] Additionally, nutrients are adsorbed on to particulate surfaces, thereby enabling the attached bacteria to grow more rapidly than those in free suspension, and increased turbidity reduces light penetration into the water column, enhancing the survivability of bacteria.

The Sanctuary also plays a role in enforcing MBNMS regulations that prohibit discharges directly to the Sanctuary (with a number of exceptions, none which apply here), or discharges from outside the boundary of the Sanctuary that enter and injure a Sanctuary resource. The MBNMS enforcement philosophy is based on preventive enforcement, with a strong emphasis on outreach and education. While the Sanctuary has in the past relied primarily on the two Regional Water Quality Control Boards for enforcement of discharge violations, it does have enforcement capabilities that can result in civil penalties. The State Water Resources Control Board has stated that while sanitary sewer overflows and sewage spills are not subject to minimum mandatory penalties, the California Water Code provides for penalties for unauthorized discharges.[4] Sanctuary

[3] Jensen, P., Hanadi, R., Battenfield, T., Payne, S. **Public Works**. *Identifying Bacteria Sources.*

[4] SWRCB General Counsel, Question and Answer Paper. April 17, 2001

emergency response staff are also involved when spills occur to gather information on the extent of the spill and assess damage to Sanctuary resources.

The Sanctuary also works with local jurisdictions to garner financial resources to address coliform contamination issues. Recently, the Monterey Bay Sanctuary Foundation worked with the Cities of Monterey, Pacific Grove, and the Monterey County Department of Environmental Health to submit a joint proposal for funds under the Proposition 40 – Clean Beaches Initiative. The proposal seeks funding for a coordinated approach to addressing the beach closures and postings through sewer infrastructure diagnostics and repairs, a genetic source analysis, and monitoring and education programs. The Sanctuary also works with local jurisdictions to raise public awareness of coliform contamination issues. In January of 2001, the Sanctuary co-hosted two public forums with local cities and counties on beach closures designed to share information on the sources of contamination and potential solutions to the problem.

This past work has focused on issues that are related to coliform contamination, but the Sanctuary has not yet dealt comprehensively with the subject of beach closures and postings. Effectively addressing this issue will require a regional approach that cuts across jurisdictional and political boundaries. An effort to reduce coliform contamination and improve beach water quality monitoring will therefore build on the WQPP Memorandum of Agreement designed to facilitate interagency cooperation and signed by eight federal, state, and local entities during Sanctuary designation in 1992. With your help, the Sanctuary hopes to continue to successfully work with stakeholder groups and develop a plan that will effectively characterize the beach closure issue, create strategies to reduce the number of beach closures and postings, and identify funding mechanisms to implement the recommendations.

WORKING GROUP ROLE

The role of the working group is to develop the framework for a regional interagency plan to identify and minimize the causes of beach closures and coliform contamination within the Sanctuary. Some potential components to be further developed and addressed in the plan are listed below as a starting point for working group discussion.

Coliform Monitoring:

- Genetic analyses to assess human versus wildlife contributions
- Real-time testing and analyses to improve temporal resolution of results
- Upstream monitoring to refine sources
- Improved analysis techniques to link to pathogens

Beach Posting and Notification Systems:

- Improved beach signage
- List serves for key users such as divers, surfers

- Websites

Infrastructure Problems:

- Aging and cracked pipes
- Leaching
- Insufficient capacity of pipes
- Illicit connections (sewage into storm drains)

Maintenance:

- Lack of resources for maintenance of public systems
- Private repairs push clogs in laterals to main lines
- Roots growing into sewer lines
- Improperly maintained septic systems

Behavioral problems:

- Grease down drains
- Clogs from styrofoam, paper, diapers, toys, etc.
- Pet droppings left behind

Education and Technical Training:

- Education of public re behavioral issues
- Training of public works staff and businesses

Enforcement:

- System of state and/or federal enforcement for spills
- Equitable enforcement across jurisdictions
- Use of fines for related projects in region on monitoring, education, etc.

Emergency Response:

- Notification of key parties when spill occurs
- Rapid response system and equipment to retain flows
- Guidelines for clean up and potential alternatives to use of bleach

Funding:

- Identification and pursuit of funding sources
- Regional coordination for attracting and leveraging funds
- Building public support for necessary funding

- Include local beaches on 303(d) list